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Enhancement of rural livelihood through value added products of finger millet (*Eleusine coracana* L. Gaertn)

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Abstract
Finger Millet (*Eleusine coracana* L. Gaertn), also known as Ragi, is an important staple food in Bastar district of Chhattisgarh state. It is rich in protein, iron, calcium, phosphorus, fibre and vitamin content. During the last few years, demand of finger millet has been increased at urban as well as city market and it is expected that this will lead to doubling of Ragi production that can be easily transformed in convenient forms. The higher production should be transformed into value added products and is present need across the globe. Considering this phenomenon targeted tribal people are trained and enabled in this direction. Therefore, by involving scientific intervention by Krishi Vigyan Kendra, Bastar working in area of improving the livelihood of farmers, an effort has been made to enhance income source of tribal farmers. The women of three Self-Help Groups (SHGs) of *viz.* Maa Lakshi, Bajrangbali and Maa Parvati of block – Bastanar from Bastar region of Chhattisgarh, were trained for utilization of finger millet into Production of various value-added products. Hygienic, good quality, nutritious Multigrain flour and Ragi malt were prepared by the groups and sold *via* local wholesale system. Remarkable result revealed and earned profit worth of `1060.00 to `1515.00 from per quintal of the product. This effort has shown a way for enhancing the economic potential of tribal farmers in the Bastar region.

Keywords: Finger millet, multigrain flour, ragi malt

1. Introduction
Millets are one of the traditional crops known to humans and possibly the first cereal grain to be used for domestic purposes. Utilization of these crops is mainly as food for human consumption. The grain is consumed in traditional way and almost the entire produce is utilized at the farm/village level. Chhattisgarh state has 5.88 million hectares of cultivable land. The state occupies 248.50 thousand hectares of land (which is 21.18% of India's 1173.5 thousand ha) under minor millets with total production of 52.10 thousand tons (which is only 10.22% of total national production of 509.8 thousand tons) and yield of 210 kg/ha against national productivity of 434 kg/ha (www.dacnet.nic.in). In Bastar Plateau Zone, the area under minor millets is 28.41 thousand hectares, 39.73% of the Chhattisgarh state area of 71.50 thousand hectares. While the total production is 7.95 thousand tons which is 37.06% of the state's production of minor millets of 21.45 thousand tons (Sahu and Sharma, 2018) [5].
Government of India is celebrating year 2023 as International Year of Millets (IYOM) after getting support by 72 countries and United Nation's General Assembly (UNGA) on 5th March 2021 to make it peoples' movement so that the Indian millets and its value-added products could be accepted globally. In order to promote millets, Chhattisgarh is the only state where minor millets *viz.*, Kodo millet, Kutki millet and Finger millet (also known as Ragi) are being procured at Minimum Support Price (MSP), Kodo-Kutki millet is being procured at `3000/q while Ragi is being procured at `3377/q to help the tribals and other farmers of the state. Bastar region in Chhattisgarh state is tribal dominated district famous for production of traditional crops like minor millets, where cultivation is almost rainfed and most suitable for millet crops. One of the minor millets is finger millet (*Eleusine coracana* L. Gaertn), still grown by almost all the tribal farmers for mostly their own consumption. But now in India, it is becoming as important food grain in the diets of large section of population because of their multiple nutritional qualities like high calcium content and suitable for diabetic patient due to low glycemic index (Patel *et al.*, 2014) [4]. Being a healthy option for nutrition and health, the demand for millets is continuously increasing in urban as well as in the global market. It is expected that this can be double when presented in convenient form. However, proper processing and value addition can help in fetching premium price and can be a possible source of enhancing livelihood of tribal farmers.

2. Materials and Methods

2.1 Study area and methodology

An attempt has been made to increase the income source of tribal farmers, for this purpose three Self-Help Groups (SHGs) namely, Maa Lakshmi, Bajrangbali and Maa Parvati groups from different villages of block-Bastanar were selected for the study. The villages namely, Kodenar, Badekilepal and Bastanar were purposively selected keeping in view the biophysical diversities, *i.e.*, distance from (i) block headquarter (ii) market growth centers, and (iii) road to bus points (Nag *et al.*, 2011) [3]. The particulars of villages are as follows:

1.	Total village selected for study	03
2.	Total SHGs selected for study	03
3.	Proximity of village from nearest road	0-5 km
4.	Proximity of villages from nearest market	0-5 km
5.	Nature of composition of villages	Multicast
6.	Total population of sample villages	15690
7.	Total households in sample villages	3344
8.	Female population in sample villages	52.07%
9.	Total literacy rate	23.53%
10.	Female literacy rate	9.53%
11.	Scheduled tribes' population	90.20%
12.	Scheduled caste population	0.70%

From these selected villages study was conducted in three targeted groups as mentioned. The groups were structured separately with each village where president and secretary having bank account in name of the Self-Help Groups (SHG).

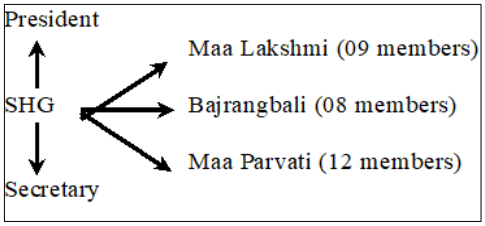

Fig 1: Hierarchy of Self-Help Groups

2.2 Capacity building training

An advanced training was given to SHGs by the experts designated at the Krishi Vigyan Kendra, Bastar working in the area of these aspects for crop cultivation, processing, value addition and quality control of minor millets. Besides providing processing and production technology the SHGs were also trained for development of production plan, packing, financial management and negotiation skill.

2.3 Processing and value addition

Minor millets hold immense nutritional importance and health promoting properties. They offer a range of nutrients and bioactive compounds, making them superior to rice and wheat in terms of nutritional value. The gluten-free nature of millets positions them as a favourable choice for individuals with gluten sensitivity or those seeking gluten-free food options. Moreover, the potential health benefits of millets, such as their impact on heart health, diabetes management, and digestive well-being, make them a valuable addition to the diet. Encouraging the consumption of millets, both in traditional dishes and modern food products, can contribute to improved overall health and nutrition, benefiting communities across the globe. Embracing millets as a staple food source can pave the way for a healthier and more sustainable future for individuals and societies worldwide (Anagha, 2023) [1].

Millets are the second important crop after rice grown by the tribal farmer of Bastar, they are an important ingredient of household food, health security and nutrient particularly in drought years. Value addition in Ragi has great potential in increasing the profitability of farmers (Mishra *et al.*, 2011) [2]. The method of processing of various value-added products like Multigrain flour and Ragi malt are:

2.3.1 Multigrain flour

Utilizing finger millet (Ragi) is prepared. To prepare this wheat flour is fortified with finger millet in the ratio of 7:3 (wheat: finger millet). Finger millet is a humble grain with low-glycemic index which makes it more suitable for diabetic patients. Additionally, it is a rich source of calcium (344 mg/100 g) and helps in supplementing calcium in human body. Fig 2. represents the process flow chart for preparation of multigrain flour.

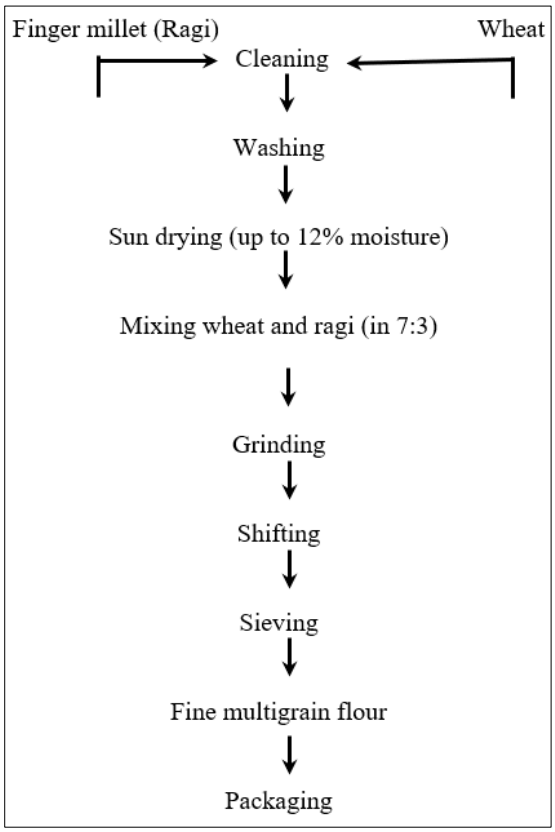

Fig 2: Multigrain flour production technology

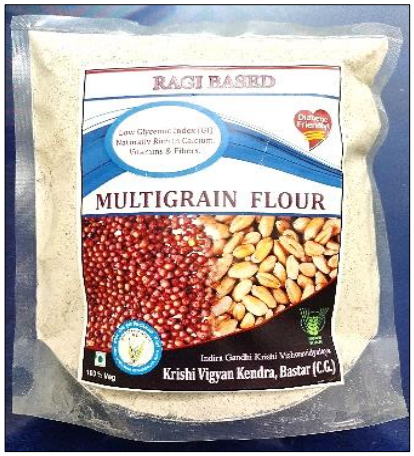

Fig 3: Multigrain flour

2.3.2 Ragi malt

Simple processing techniques such as germination and puffing helps in reducing the anti-nutritional factors. Finger millet provides superior nutritional and technological characteristics than major cereals. Excellent malting characteristics also enhance the bio-availability of nutrients. Ragi malt is prepared by the process of malting by mixing the gram, green gram and ragi in ration of 1:1:3. The process flow chart for preparation of ragi *malt* are as follows:

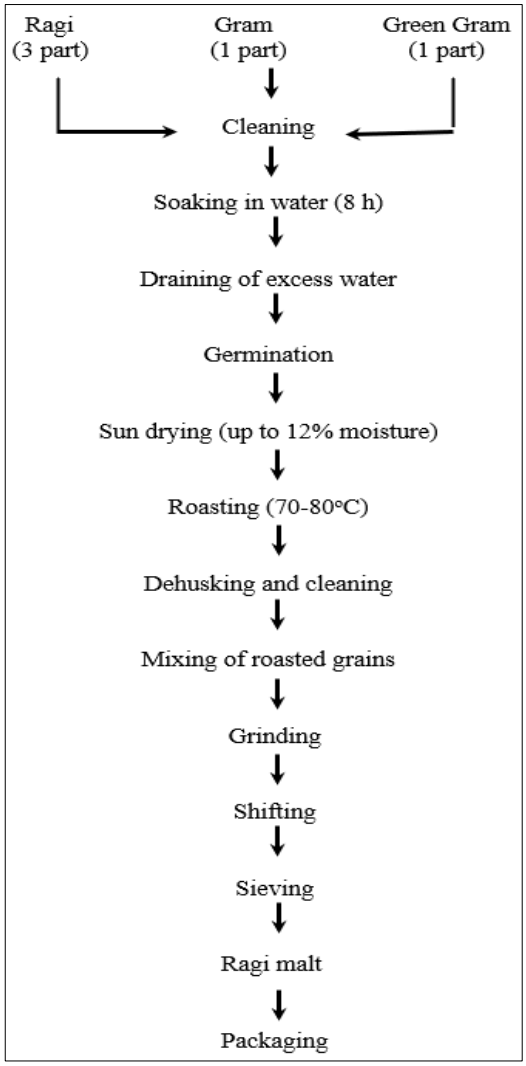

Fig 4: Ragi malt production technology

Fig 5: Ragi malt

2.4 Mode of working

Each member of the groups was trained at the millet processing unit of the Krishi Vigyan Kendra, Bastar which was established to strengthen the tribal people in the field of processing and value addition. Prepared value-added products are sold by the groups in the local market and also under the marketing skill support of the experts by providing the name of Krishi Vigyan Kendra, Bastar on the packaging. The working mode of the groups are briefed in Fig 6.

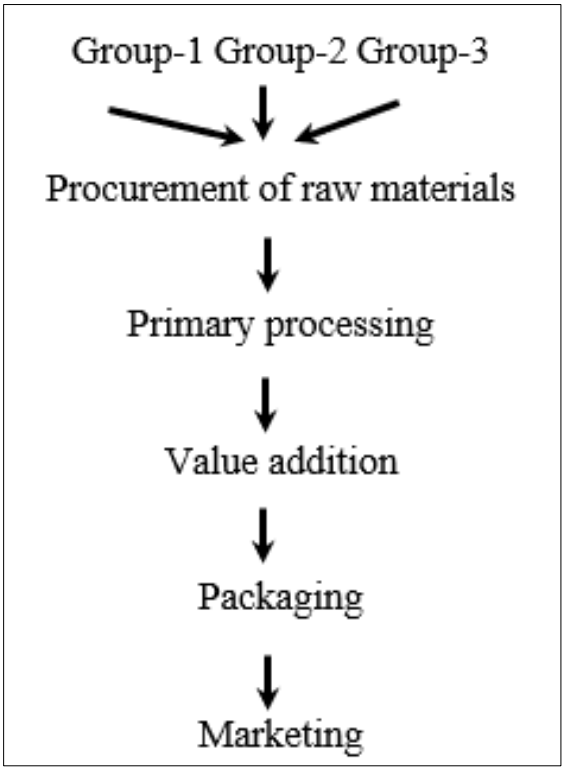

Fig 6: Mode of working of groups

3. Results and Discussion

Majority of the beneficiaries are middle aged, educated at least up to primary level, having medium land holding with medium annual income and on the basis of one year data results are being discussed. The invest of initial cost for raw material procurement and processing of finger millet value added products among the SHGs was self-arranged by the group. The quality products were successfully prepared by the groups and sold in local market to whole sale merchants. The consolidated initiation of SHGs on value added products like Multigrain flour and Ragi malt was new ways of self-reliance practices. The Krishi Vigyan Kendra, Bastar also provides the marketing and promotion facility of products through linking up the SHGs by Farmers Produces Organization – Bhumgadi Mahila Krishak Producer Company Limited, Bastar to motivate the involved people for production, processing and value-addition. Table 1 and 2 provides the cost-economics involved in the preparation of finger millet based value-added products.

It can be easily depicted from both Tables that each group is earning `1060/q and `1515/q from Multigrain flour and Ragi malt respectively. The impact of improving the SHGs giving support *viz.* financially and technologically boosted the enthusiasm of tribal farmers. Although it is like a deep in ocean yet steps toward self-reliance on own produces.

Table 1: Cost-economics analysis of Ragi malt production (per quintal)

S. No.	Ragi malt			
	Particulars	**Quantity**	**Unit rate (₹)**	**Total amount (₹)**
1.	Gram	20 kg	70/kg	1400
2.	Moong	20 kg	120/kg	2400
3.	Ragi	60 kg	35/kg	1500
4.	Polyethylene Bags	200 Nos.	1.5/pc.	300
5.	Electricity & Manpower Charges	--	--	750
6.	Losses	@10%	--	635
7.	Total Cost	--	--	6985
8.	Sale Price	100 kg	85/kg	8500
Total Profit		100 kg	15.15/kg	1515

Table 2: Cost-economics analysis of Multigrain flour production (per quintal)

S. No.	Multigrain flour			
	Particulars	**Quantity**	**Unit rate (₹)**	**Total amount (₹)**
1.	Wheat	70 kg	30/kg	2100
2.	Ragi	30 kg	35/kg	1050
3.	Polyethylene Bags	100 Nos.	1.5/pc.	1500
4.	Electricity & Manpower Charges	--	--	750
5.	Losses	@10%	--	540
6.	Total Cost	--	--	5940
7.	Sale Price	100 kg	70/kg	7000
Total Profit		100 kg	10.60/kg	1060

Conclusion

It can be concluded from the study done at various villages of Bastar region of Chhattisgarh that processing and preparing of Ragi malt and Multigrain flour have shown a way for enhancing the economic potential of tribal farmers. Further processing and value addition increased the income of the tribal in many folds. The above-discussed method is very helpful to the farmers by adopting and applying these simple techniques for ragi-based products processing and thereby increasing the income and improving the livelihood. The large-scale processing unit can also be established in the production catchments with budget availability on a community basis.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Anagha KK. Millets: Nutritional importance, health benefits, and bioavailability: A review. The Pharma Innovation Journal. 2023;12(8):223-227.
2. Mishra NK, Patel S, Sahu Rahul, Nag SK and Verma PK. Process technology to develop ragi based value added food products. Research Journal of Agricultural Sciences (An International Journal). 2011;2(3):779-783.
3. Nag SK, Mishra NK, Patel S, Patil SK, Rao SS, Verma PK, *et al*. Empowerment to village entrepreneurship through tamarind- processing techniques. National Seminar on Agricultural Engineering: The Way to Improve Rural Economy, Indira Gandhi Krishi Vishwavidyalaya, Raipur. 2011 Jan. p. 608-610.
4. Patel S, Naik RK, Sahu R, Nag SK. Entrepreneurship development through finger millet processing for better livelihood in production catchment. American International Journal of Research in Humanities, Arts and Social Science. 2014;8(2):223-227.
5. Sahu RK, Sharma ML. Small millets production and marketing trends of the tribal farmers in the Bastar plateau zone. International Journal of Current Microbiology and Applied Sciences. 2018;7:4078-4089.